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HEADQUARTERS

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JUNE'S THEME: Corps History - 225th Anniversary

DWIGHT'S NOTES

On 16 June 1775, two hundred twenty five years ago, George Washington appointed Richard Girdley chief engineer of the Continental Army. From its first actions at the Battle of Bunker Hill, the Corps of Engineers has been a leader in the growth and development of the nation. The Office of History has provided a brief history of the Corps for our theme article this month. It is excellent. Read it and share it.

I've been a student of the Corps for some time. In my MPA studies at American University I read dozens of books and articles about our history. Many laudatory, an equal number critical. And I wrote and spoke about us for my instructors and classmates. Our history is a history of American. I want you to study it too for this history tells us much about who we are and who we can become. Contact your history office for information and assistance.

Kris Allaman is working with Paul Walker to set up a history "lesson" for headquarters senior leaders. This was prompted by MG Hunter's interest in using history to help guide us into this new millennium.

We should be justly proud of our long heritage in helping to build this great nation. This is no time to rest on our laurels, though. The Corps has maintained its relevance for over two centuries by anticipating changing national needs. The current pace of change, though, far exceeds anything we have experienced in the past. The Corps leadership, competency, and relevance are being challenged in several areas of our traditional strengths. National priorities are shifting, placing stress on our relationships with environmental as well as economic advocates. We've helped the private sector succeed in growing competencies once held almost exclusively by Army Engineers. They want to and can do more of what we once did with our own forces. We all need to pick up the pace of anticipating and adapting to changing times.

The pace of change in headquarters E&C is indeed quick. Our first challenge is completing the restructuring of the Engineering and Construction Division. A headquarters selection panel, co-chaired by MG Hunter and MG Van Winkle, with MG Fuhrman's concurrence, has chosen Don Dressler as E&C's new Deputy Division Chief. Don brings with him a depth of knowledge in both Civil Works and Military Programs engineering. The new branch chiefs are Roy Braden (Infrastructure Branch), Earl Eiker (Water Resources Branch), M. K. Miles (Technology Integration Branch), and Hari Singh (Technical Policy Branch). Each of the branch chiefs has started working with the individuals assigned to their new organizations, so that we can get off to a flying start on 16 July 2000. They are

also working diligently to wire E&C into the Civil Works PMBP under John D'Aniello's lead. (See additional information in the article Engineering and Construction Reorganization Moves into High Gear)

As we finish work in the third quarter of the fiscal year, it is time for each engineering and construction element to review its planning for the next fiscal year. I know that the fourth quarter is always busy with the completion of projects and the rush to get the final contracts awarded before the end of the end. However, this is also the time for working with the project management teams to review the plans for work in the coming year. A little extra planning effort now will pay big dividends in project completion in Fiscal Year 2001.

(Editors' note: If you want to share your thoughts with our readers regarding Dwight's Notes send an email to the E&C News editor (charles.pearre@usace.army.mil). A synopsis of your comments will be published in the next issue.)

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Corps History - 225th Anniversary

THE U.S. ARMY CORPS OF ENGINEERS - A BRIEF HISTORY

The U.S. Army Corps of Engineers traces its history back to June 16, 1775, when the Continental Congress organized an army with a chief engineer and two assistants. COL Richard Gridley became GEN George Washington's first chief engineer. Army engineers first formed into a Corps by

resolution of Congress on March 11, 1779. They were instrumental in several Revolutionary War battles, including Bunker Hill, Saratoga, and Yorktown.

At the end of the Revolutionary War, the engineers mustered out of service. In 1794, Congress organized a Corps of Artillerists and Engineers, and in 1802 re-established a separate Corps of Engineers. The Corps' permanent existence dates from that year.

From the beginning, politicians wanted the Corps to contribute to both military and civil projects. Throughout the 19th century, the Corps supervised construction of coastal fortifications, built lighthouses, helped develop harbors, and mapped navigation channels.

Once re-established in 1802, the Corps of Engineers began building and repairing fortifications. The fortification assignments proliferated before the War of 1812. The Chief Engineer, COL Jonathan Williams, expanded the fortifications protecting New York Harbor. These defenses prevented the British navy from attacking New York Harbor during the War of 1812.

After the War of 1812, the U.S. expanded its fortifications as the first line of land defense against attack. Congress reduced the size of the infantry and artillery after the war, but retained the officers authorized for the Corps of Engineers. Pleas from several secretaries of war for more engineers for fortification work led Congress to double the number of engineer officers and divide them into two Corps (the Corps of Engineers and the topographical engineers) in 1838. They reunited into a single Corps in 1863.

Although fortifications were important, perhaps the greatest gift the early Corps gave the young nation were canals, river navigation, and roads. Rivers were America's paths of commerce. They provided routes from western farms to eastern markets, and for settlers seeking new homes. But the rivers could also destroy boats with snags and sandbars. From those unruly streams, Army engineers carved navigation passages and harbors.

In 1824 the Supreme Court ruled that the commerce clause of the Constitution included river navigation. Congress passed two laws that profoundly affected the future of the Corps. The first, the General Survey Act, authorized the president to survey routes for roads and canals, which was delegated to the Corps of Engineers. The second act appropriated $75,000 to improve navigation on the Ohio and Mississippi rivers by removing sandbars, snags, and other obstacles. Later amendments included other rivers. The Corps, the only trained engineers available to serve Congress and the executive branch, got this work. The work was important. The topographical engineers, who reported to a Topographical Bureau in the Engineer Department, did much of it. As surveyors, explorers, cartographers, and construction managers, the "topos" helped open the nation to development and settlement.

Congress expanded the engineers' work in 1826 by authorizing additional surveys, providing navigation improvements on inland rivers, and building harbor jetties. This act was the first to combine authorizations for both surveys and projects, establishing a pattern that continues to this day. Removing sandbars in the Ohio River was an early project of engineer innovation. By September 1825, MAJ Stephen Long, working on the Ohio River below Henderson, KY, had built a wing dam with two rows of more than 600 wooden piles. Theory and empirical data agreed that the increased velocity should reduce the sandbar and increase river depth. Long figured out the angle and length for the dam, and it was the prototype for many others along the Ohio River.

But Long wasn't satisfied because he knew the dam would not prevent sandbars. The Ohio would carry sediment downstream, forming bars at many different points. MAJ Long convinced COL Alexander Macomb, Chief of Engineers, to sponsor a contest to find a machine to eliminate navigation obstructions. The winner would receive $1,000 and a contract to open up the Ohio River.
But the winner designed a boat of limited use and argued with Macomb over contract terms. Long suggested replacing him with Henry Shreve, a man known for navigation skill and pioneering efforts to bring commerce to the Mississippi Valley. Shreve built a revolutionary steam-powered snag boat. Put into service in 1829, Shreve's boat rammed into snags, jarring them loose. The limbs were hoisted and broken apart on deck. The impact of the snagboat and those that followed was dramatic. Insurance and shipping rates dropped, and shipping increased on the Mississippi and Ohio rivers.

1853 saw a milestone in dredging history, when the Corps contracted for the first hopper dredge and used it in Charleston Harbor. The dredge used two large dippers to dig into the harbor bottom, lift up sediment, and deposit it in a hopper in the hull. At a disposal site, the dredge dumped the material through well holes in the hopper. Earlier dredges needed another vessel to haul material to disposal sites, but the hopper dredge could do it all. The Corps replaced this early dredge in 1857 with the *General Moultrie,* a hopper dredge using a centrifugal pump to suction up sediment. This was the world's first hydraulic dredge, the prototype for all future hopper dredges.

After the Civil War, an Army Engineer Board concluded that locks and dams on the Ohio River were preferable to wing dams, dredging, and canals. MAJ William Merrill, in charge of Ohio River improvements, needed to develop river regulation dams to allow coal barges to pass. He concluded that the wicket dam designed by Jacques Chanoine in 1852 was best for the Ohio River, and in 1874 he proposed that a series of movable dams employing Chanoine wickets be built.
Congress approved Merrill's plan in 1877, and the Corps began building the Davis Island project near Pittsburgh. The 110x600-foot lock and 1,223-foot dam were the largest in the world at the time. The Davis Island Lock was also one of the first to use concrete. This success led Congress to authorize extending the project down the Ohio, which was completed in 1929.

Throughout the 19th century, engineer officers built, maintained, and rehabilitated canals and river navigation features. They surveyed canal routes on the Chesapeake and Ohio rivers and Muscle Shoals. Several Army engineers launched their careers at Muscle Shoals canal after the Civil War, including George Goethals. The nation would call on Goethals again for the Panama Canal.
Canal building continued in the 20th century. After the federal government purchased the Chesapeake and Delaware Canal in 1919, Wilmington (Delaware) District deepened the channel and added bridges. Traffic increased, and demands were made to enlarge it. The canal became part of an intercoastal waterway to connect bodies of water from Boston to Key West to the Rio Grande. Today, the Corps retains responsibility for this canal and the entire Intracoastal Waterway.

Besides building canals, locks, and other navigation features, Army engineers performed important surveys, especially the Great Lakes and Mississippi Delta. Topographical engineer Capt. William Williams, superintendent of harbor improvements on Lake Erie, headed the survey. From 1841 to 1860, surveyors measured the discharge of rivers into the Great Lakes; surveyed rivers, narrows, and shoals; developed charts and maps; and marked danger points. The Corps continued this work until 1970, when much of the mission transferred to the National Oceanic and Atmospheric Administration. Detroit District still forecasts lake levels.

The Mississippi Delta survey had an importance out of proportion to the funds invested. In September 1850, responding to congressmen seeking assistance to fight floods that struck lower Mississippi River communities, Congress appropriated $50,000 for a topographical and hydrographic survey of the delta. This included studying the best way to secure a 20-foot navigation channel at the river mouth. Topographical engineer CPT Andrew Humphreys led the survey, but the field work of 2LT Henry Abbot was so indispensable that Humphreys named Abbott co-author of the report. It was full of new details about the Mississippi Basin from the Ohio River to the Gulf. They obtained data on river flow, channel cross-sections, and topographical and geological features. The conclusions of Humphreys and Abbot influenced the development of river engineering and the evolution of the Corps. The authors believed that levees alone could control flooding along the lower Mississippi. The Corps accepted this view for nearly 60 years.

In the 19th century the Corps also built roads. The most famous was the Cumberland or National Road built between 1811 and 1841. It extended from Cumberland, MD, across the Appalachian Mountains to Wheeling, WV, and then across Ohio and Indiana to Vandalia, IL. In building the National Road, the Corps applied asphalt-paving techniques developed in England, and innovative bridge construction. At Brownsville, Penn., CPT Richard Delafield built the first bridge in the U.S. with an iron superstructure, an 80-foot span still in use. By 1840 engineer officers had overseen construction of 268 miles of paved road.

Engineer officers also supervised railroad work after 1824. They surveyed routes and, once construction began, the War Department loaned engineers to the railroad companies. By the year 1830 many officers had been granted furloughs to work on railroads in either construction or surveying. In the 1850s westward expansion generated interest in a rail link from the Mississippi River to the Pacific Coast, and topographical engineers surveyed four alternate routes, gathering a great deal of scientific information at the same time.

The Corps sponsored two more surveys after the Civil War. One survey explored the 40th parallel route from the eastern slope of the Sierra Nevada to the western fringes of Wyoming and Colorado, while the other explored the Southwest. Both expeditions produced a wealth of data on the natural history of the West.

Engineers of all ranks gained renown for service in Mexico in 1846-48. Chief Engineer Joseph Totten directed the successful siege of Veracruz, from which GEN Winfield Scott launched his decisive assault on the interior of the country. CPT William Williams, who directed the Great Lakes survey, served as chief topographical engineer for GEN Zachary Taylor until his death at the battle of Monterey.

During the Civil War, Army engineers built bridges, forts and batteries, demolished enemy supply lines, and conducted siege warfare. In December 1862 they laid six pontoon bridges across the Rappahannock River, under heavy fire, to support the Union attack on Fredericksburg, VA. The 2,170-foot pontoon bridge which Union engineer troops laid across the James River in June 1864 near Petersburg, VA, was the longest floating bridge on record until World War II. Army engineers during the Civil War included many excellent military strategists who rose to leadership roles. Among them were Union generals George McClellan, Henry Halleck, and George Meade, and Confederate generals Robert E. Lee, Joseph Johnston, and P.G.T. Beauregard.

In the early 19th century, the Corps built many projects to support the Department of Treasury. For instance, they helped build three customs houses and several hospitals to treat merchant seamen. Between 1831 and 1851, engineer officers also built dozens of lighthouses, which involved difficult, dangerous construction. The Corps also contributed to building many public buildings and monuments in Washington, D.C. This began in 1822 when Isaac Roberdeau, a topographical engineer, supervised installing cast iron pipes to bring spring water to the White House. In 1853, responsibility for building a permanent water supply for Washington fell to LT Montgomery Meigs. His project included two bridges and water pipes over Cabin John and Rock creeks. The Cabin John Bridge, built 1857-64, remained the world's longest masonry arch for more than 40 years, and is still in use. In 1867 Congress gave control of public parks and monuments to the Office of Public Buildings and Grounds under the Chief of Engineers, and in 1878 replaced Washington's elected officials with a three-man commission. An Army engineer called the Engineer Commissioner for the District of Columbia served on that board and was responsible for the city's physical plant until Congress approved the district's current home rule in 1967. During the last half of the 19th century, the Corps improved navigation on the Potomac River; expanded the local water supply; completed the Washington Monument; helped design and build numerous structures including the Executive Office Building, the Lincoln Memorial, the Library of Congress, and the Government Printing Office; reclaimed swampland to create the Tidal Basin; and developed Rock Creek Park.

The Corps became involved in flood control after the Civil War, particularly on the Mississippi where floods impaired commerce, destroyed property, and cost lives. In 1879 Congress created the Mississippi River Commission (MRC) composed of three people from the Corps (including the president), three civilians (including at least two civil engineers), and one from the U.S. Coast and Geodetic Survey. Congress created the MRC to insure that the best advice from both the military and civilian communities was heard to improve the Mississippi River for navigation and flood control. After many debates, the commission decided to rely on levees to protect the lower Mississippi Valley. Cooperating with local levee districts, the MRC oversaw building many levees along the river. Later, considerable dredging supplemented levee construction. The MRC also attempted to stop bank erosion with willow mattresses. In the early 20th century, the Corps developed the articulated concrete revetment now used to protect the riverbanks.

In 1893, Congress formed the California Debris Commission (CDC) made up of three Army engineers to regulate California streams devastated by sediment from mining operations. Given substantial power, the CDC significantly reduced damage.

In 1917, as the U.S. faced World War I, the Corps could look back with satisfaction. The work of engineer officers had been impressive. For instance, after the 1900 hurricane, former Chief of Engineers Henry Robert chaired a commission to plan the Galveston Seawall. Hiram Chittenden supervised building roads, bridges, and aqueducts in Yellowstone National Park. His survey of reservoir sites in Wyoming and Colorado helped establish the Bureau of Reclamation. He wrote several works about the early exploration of the Missouri River Basin, and became a recognized expert on flood control. Goethals' work at Davis Island and Muscle Shoals gave him the expertise to finish the Panama Canal, which was built by the Panama Canal Commission, not by the Corps. But Army engineer officers detailed to the commission helped overcome some of the most difficult construction obstacles.

The British and French governments made American engineers their top priority after the U.S. entered World War I in April 1917. By the end of August, nine new engineer railway regiments and the

engineer regiment of the 1st Division had arrived in France. While serving with the British near Cambrai, France, on September 5, SGT Matthew Calderwood and PVT William Branigan of the 11th Engineers were wounded by artillery, becoming the first U.S. Army casualties in Europe. The engineer troops who served in France 1917-18 contributed to both front-line and rear support. The combat engineers built bridges, roads, and narrow-gauge railroads at the front. The forestry troops of the 20th Engineers produced about 200 million feet of lumber. Other engineer troops enlarged French ports, built more than 20 million square feet of storage space, and 800 miles of rail lines, plus an equal distance in rail yards and storage tracks. Engineers also organized the first U.S. tank units and developed chemical warfare munitions and defensive equipment. These proved so important that in 1918 the War Department created a separate Tank Corps and a Chemical Warfare Service.

Neglected waterways and the need for hydropower and irrigation in the West drew attention to water resources early in the 20th century. Multipurpose partisans advocated applying scientific management to ensure efficient water use. This meant a program of development to address all applications of water resources. Back then, water unused was considered "wasted" water. Unlike the West, where irrigation was the initial focus, the East needed hydropower. Beginning in the early 1880s, when a plant in Appleton, WN, first used water to produce electricity, hydroelectric dams proliferated. These private dams threatened navigation and forced Congress (through the Corps) to regulate dam construction. Congressional acts passed in 1890, 1899, and 1906 required that the Secretary of War and the Corps approve dams to be built across navigable streams. Private interests developed most power projects before World War I. The Corps installed a power station at Lock and Dam 1 on the upper Mississippi River. The government later leased it to Ford Motor Company. In 1919, the Corps began building Dam #2 (renamed Wilson Dam) as a hydroelectric facility at Muscle Shoals on the Tennessee River. President Franklin Roosevelt favored federal hydropower projects to provide low-cost energy. During the New Deal, the Corps participated in three major hydroelectric projects — Passamaquoddy Tidal Power Project in Maine, Bonneville Dam on the Columbia River, and Fort Peck Dam on the Missouri River. In 1937, Congress created the Bonneville Power Administration to sell power generated at Bonneville Dam.

Meanwhile, concern about flood control grew. In 1912–13, two floods devastated the lower Mississippi Valley and showed the inadequacy of the levee system. Another flood came in 1916, and Congress passed the first flood control act the following year for the Mississippi and Sacramento rivers. Still, the MRC and the Corps continued to depend on levees. That policy changed in 1927, when one of the worst floods in history hit the lower Mississippi. Between 250 and 500 people were killed, more than 16 million acres were flooded, and more than 500,000 people were forced into refugee camps. Clearly, levees were not the answer. MG Edgar Jadwin, Chief of Engineers, drew up a plan to disperse water through controlled outlets and floodways, while still retaining levees. Congress approved this plan in the 1928 Flood Control Act. This act launched what today is called the Mississippi River and Tributaries Project, which has prevented billions of dollars of flood damage.

Floods continued elsewhere. In addition, the 1930s saw the Great Depression. Responding to the need for flood protection and work relief, Congress passed the 1936 Flood Control Act, which declared that flood control was a proper federal activity. The Corps had already built a few reservoirs, but this declaration made reservoir construction a major mission. It also established that a potential project's economic benefits must exceed its costs. Furthermore, the act specified obligations to be assumed by local interests before the Corps could begin certain projects. The 1944 Flood Control Act empowered the Secretary of the Interior to sell power produced at federal projects. The act also authorized the giant multipurpose civil works project for the Missouri Basin called the Pick-Sloan Plan. It combined

the plans for developing the Missouri Basin proposed by MG Lewis Pick, formerly Missouri River Division Engineer, and W. Glenn Sloan, the assistant regional director for the Bureau of Reclamation. The Corps built several huge dams on the Missouri River. These dams were all multipurpose, providing flood control, irrigation, navigation, water supply, hydropower, and recreation. After World War II, federal multipurpose projects expanded. Congress authorized major hydropower systems on the Columbia, Snake, Missouri, and Arkansas rivers. By 1975, Corps projects produced 27 percent of the nation's hydropower.

Shortly before the U.S. entered World War II, Congress and the War Department approved transfer of military construction from the Quartermaster Corps to the Corps of Engineers. The Army implemented the shift piecemeal. After the Destroyers for Bases Agreement of September 1940, GEN George Marshall assigned the Corps to build air bases in British territories from Newfoundland to British Guinea. In November 1940, Marshall transferred all air base construction in the U.S. to the Corps. Finally, in December 1941, Congress gave the Corps responsibility for real estate acquisition, construction, and maintenance for Army facilities. Domestic base construction peaked in 1942, as the nation geared up for war. Military construction expenditures in July exceeded that spent from 1920 to 1938. By the end of 1942, the Army could house 4.37 million soldiers and provide hospital beds for 180,000. It had built 149 munitions and aircraft manufacturing plants, and depots with 205 million square feet of storage space.

In World War II, Army engineers built bridges across rivers in Italy, France, and Germany. They operated on beaches during assault landings in Europe and the Pacific. At Normandy, engineers under heavy enemy fire cleared lanes for landing craft by destroying mine-bearing steel structures and bulldozed roads up narrow draws through cliffs lining the beaches. During the Battle of the Bulge, engineers destroyed critical bridges, slowing the German advance while Allied forces regrouped. The engineers also built roads across wilderness between Canada and Alaska, and between Assam Province in India and Yunnan Province in southwestern China.

Engineer operations continued during the Korean War. They destroyed bridges over the Naktong River and built fortifications that helped American and South Korean forces hold the Pusan perimeter while GEN Douglas MacArthur prepared his amphibious assault at Inchon. When Chinese forces entered the war and forced the Americans to retreat, the engineers built roads behind new defensive lines that permitted the movement of forces and equipment to areas under attack. In Vietnam, engineers cut access to enemy strongholds to support search-and-destroy missions. To assist these efforts and reduce enemy attacks on military convoys, the engineers introduced the Rome plow, a military tractor equipped with a protective cab and a special tree-cutting blade. Engineer troops also built 900 miles of highways connecting the major population centers of Vietnam, and monitored construction by private American contractors of another 550 miles of highways.

The Corps' first formal disaster relief mission was the Mississippi Flood of 1882, supporting the Quartermaster Corps' in rescuing people and property. Army engineers also played a critical role in the Johnstown, Penn., flood of 1889, and the San Francisco earthquake of 1906. In 1917, the Army reorganized its disaster relief responsibilities and assigned command and control during disasters to department or Corps area commanders. After major flooding in 1937, the Chief of Engineers ordered all Corps districts to develop flood emergency plans.

In 1947, the Corps responded the a disaster in Texas City, Texas, where a ship carrying 2,400 tons of ammonium nitrate exploded. Two years later, it handled its first major snow removal emergency, a

massive blizzard on the Great Plains. By 1950, the Corps had a reputation for responding effectively to disasters. Under the Federal Disaster Relief Act of 1950, the Corps continued to be the lead federal agency during floods. Five years later, Congress passed Public Law 84–99 which authorized the Corps an annual fund of $15 million for flood emergency preparation, flood fighting and rescue, and repair or restoration of flood control structures. In 1964 the Corps responded to the Alaskan earthquake, and Hurricane Camille in 1969. The damage caused by these events and Tropical Storm Agnes in 1972 prompted Congress in 1974 to broaden federal responsibility for disaster assistance.

By the 1980s the Corps' mission had expanded from flood fighting to other hazards. So the Corps established an emergency management program. In 1988 the Robert T. Stafford Disaster Relief and Emergency Assistance Act authorized the Federal Emergency Management Agency to handle all disasters. The Corps has worked closely with FEMA ever since. Between 1989 and 1992, the Corps responded to the Alaska oil spill, Hurricane Hugo, and the Loma Prieta earthquake. Between 1992 and 1995 the Corps performed major repair work after Hurricanes Andrew and Iniki, the Midwest floods, and the Northridge earthquake.

Although the Corps is primarily an engineering and construction organization, it is committed to research and development (R&D). Some early R&D has been mentioned — Long's work on wing dams, Gillmore's early dredge boats, Merrill's use of concrete, and Humphreys' and Abbot's hydraulic theories. Stephen Long developed a new design for railroad bridges in the 1830s. The Long truss played a role in the transition from wooden to iron bridges. The Corps' research burgeoned during World War II. The Engineer Board at Fort Belvoir, VA, led the effort. Conducting tests at Fort Knox, KY, and on the Colorado River near Yuma, AZ, the board perfected a new steel treadway bridge that could be quickly laid on pneumatic floats for forces crossing rivers in Europe. The Engineer Board also developed improved equipment for road construction, mapping, and demolition. Working with private firms, in 1943 the Engineer Board procured the tank-dozer used to breach hedgerows in Normandy after D-day. During this time, the Waterways Experiment Station helped develop the pierced-steel plank and prefabricated bituminous surface used for rapidly building airfields. Today, the Corps' continues its R&D work at several laboratories under the Engineering Research and Development Center.

After World War II, the Corps developed and maintained new navigation systems like the McClellan-Kerr and Tennessee-Tombigbee waterways, and the American portion of the St. Lawrence Seaway. Modernizing existing waterways became a growing concern. Heavier tows with larger barges plied the rivers, and locks like those on the upper Mississippi, built mainly in the 1930s, were not adequate. Lock and Dam 26 near Alton, Ill., was a bottleneck until a new lock was built in the 1980s.
Some Corps' construction since World War II has been unusual. The Corps built Veterans Administration hospitals, missile sites, NASA facilities including the Vehicle Assembly Building at Cape Kennedy, postal facilities, and recruiting centers. Successes at home were matched by success abroad. Grecian District, established in 1947, restored Greece's transportation and communication networks damaged in World War II. Army engineers cleared the Corinth Canal, restored the port of Piraeus, and built or repaired more than 3,000 kilometers (1,860 miles) of roads.

The Corps set major precedents in Greece. For the first time, a district supervised large civil works in a foreign country, and provided technical assistance with economic aid, now typical of many foreign assistance programs. Training native contractors to perform much of the work began in Greece. Since the 1950s, the Corps has done engineering studies and projects in many countries. These include roads in Afghanistan, Iran, and other Middle Eastern countries; and air bases in Israel. Surveys dealt

with transportation networks and entire public works programs. From 1959 to 1964, Army engineers examined port and highway projects and built airports, highways, and ports in Afghanistan, Burma, British Guinea, Iran, Korea, Pakistan, Saudi Arabia, and Somalia. Under the Foreign Assistance Act of 1961, the Corps began work in reimbursable programs through the State Department's Agency for International Development. Beginning in 1963, the Corps undertook several large construction projects in Saudi Arabia. Between 1976 and 1986, this effort exceeded $14 billion, the largest construction program in Corps history. The Corps also did reimbursable work in Iran, Jordan, Kuwait, and Libya. Almost all projects involved transportation networks like roads or airports.

The Corps' role in protecting water resources has continuously evolved. In the 1880s and '90s, Congress directed the Corps to prevent dumping in harbors, a program vigorously enforced. At Pittsburgh in 1892, the Corps took a grand jury on a boat tour of the harbor and obtained some 50 indictments of firms dumping debris. In 1893 the Corps forced one Ohio community to build an incinerator and burn refuse rather than dump it in the river. In the Rivers and Harbors Act of 1899, Congress gave the Corps authority to regulate most obstructions to navigation, including effluents. In 1911, BG William Bixby, Chief of Engineers, told the National Rivers and Harbors Congress that modern treatment facilities and prohibitions on dumping "should either be made compulsory or at least encouraged everywhere in the United States."

In its current regulatory program, the Corps has authority over work on structures in navigable waterways under the Rivers and Harbors Act of 1899 and over discharge of dredged or fill material under the Federal Water Pollution Control Act Amendments of 1972. This latter requirement applies to wetlands and other aquatic areas.

The Defense Environmental Restoration Program, first funded in 1983, enlarged the Corps' environmental work on installations. The armed services had already initiated efforts to remove hazardous materials from active installations. The new program added removing hazardous waste, unsafe buildings, ordnance, and other debris from active and former military sites. The Corps, already assisting the Environmental Protection Agency for toxic waste removal in the Superfund program, assumed DERP management in 1984 for all former military sites.
(This history is based on a longer essay by Dr. Martin Reuss, Office of History, and Dr. Charles Hendricks, Center of Military History.)

POC: PAUL K. WALKER, CEHO, 703-428-7553

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District of the Month

LITTLE ROCK DISTRICT

The people who have worked in Little Rock District's Engineering and Construction offices over the past 63 years have tackled a lot of challenges. In 1937, the district earned its stripes in the design and construction of projects authorized under the Flood Control Act of 1936. Within three years, eight local protection projects involving 148 miles of levees and floodwalls were completed. Little Rock District's reputation for service and innovation grew as it developed a series of multi-use reservoirs and hydropower plants and later the $1.3 billion McClellan-Kerr Arkansas River Navigation System.

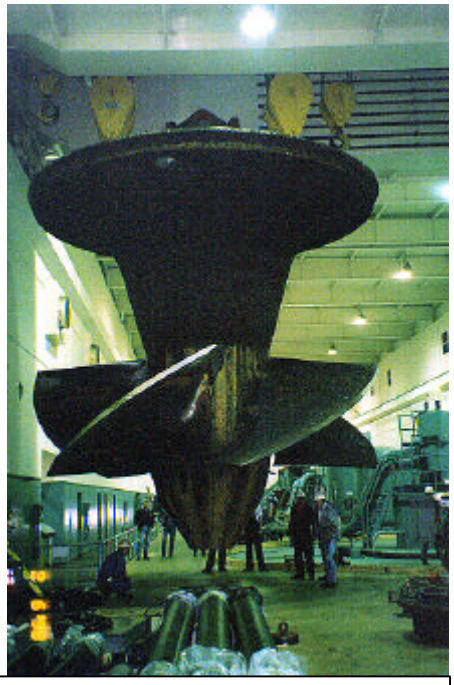
The challenges have never stopped coming for this full-service district, but they have changed in complexity and scope over the years. The district is still committed to not just meeting but exceeding the desires of its customers through innovative design work, new contracting and construction methods and regional teamwork.

Construction on the $242 million lock and dam on the McClellan-Kerr Navigation System is continuing. The first concrete will be placed in June.

There are only a few large construction projects going on in the Corps of Engineers, and Little Rock District has two of them. Montgomery Point is the last lock and dam to be constructed on the McClellan-Kerr Arkansas River Navigation System. The $242 million lock and dam are being constructed one-half mile upstream from the Mississippi River in the White River Entrance Channel to solve a chronic low-water problem. The design incorporates unique bottom-hinged, torque-tube gates to maintain the navigation channel depth. When the water level is low in the entrance channel, the 13-foot high gates will be positioned to maintain a minimum depth of nine feet. When the river stages are higher, the gates will be lowered, and vessels can pass over them instead of locking through. A new dewatering structure also had to be developed so that repair and maintenance can be done on the gates. Because of its location, the project has been designed to withstand large fluctuations in water elevations. The entire lock and dam, except for the control tower, is being constructed completely below the top banks of the channel. During very high water conditions, the entire dam will be submerged. Construction of Montgomery Point's cofferdam is complete, and concrete work is starting this year. The entire project is expected to be complete by 2002.

Table Rock Auxiliary Spillway is nearing its second phase with blasting and grubbing work complete.

Another new construction project in Little Rock District is a dam safety project on Table Rock Lake. The district is constructing a $60 million auxiliary gated spillway that will help prevent the dam from being breached in the event of a Probable Maximum Flood. To match the projected funding, the project is being constructed in three phases. The first phase started in March 1999 with the clearing, grubbing and excavation of the site. The second phase contract will be awarded in June, and it involves the construction of the actual spillway, entrance and exit channels and rerouting of a highway over the structure. The third phase will be awarded in spring 2001 and will involve the relocation of a popular recreation area. The district has worked to keep resort and theater owners, visitors and area residents in Branson, MO, a major tourist destination and the closest city to the project, informed about the project. The district also has coordinated its construction efforts with the Missouri Department of Transportation so that the auxiliary spillway project and the highway



Dardanelle Powerhouse on the Arkansas River was the first major powerhouse rehabilitation approved under the new USACE rehabilitation procedures.

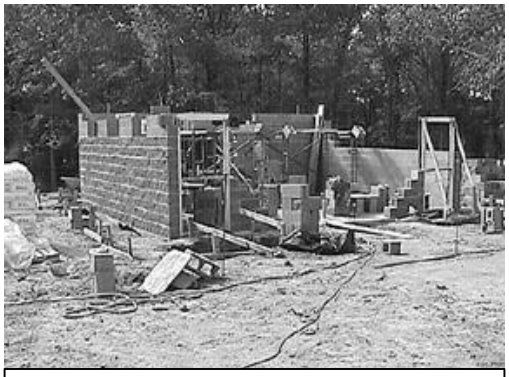
relocation project will be finished at the same time. The entire project will be complete by fiscal year 2005.

In addition to building new projects, Little Rock District is dedicated to maintaining the $6.5 billion worth of infrastructure under its authority. Some of the district's projects have been operating for 40 or 50 years, so rehabilitation work is becoming necessary. Little Rock District has become a leader in planning, design and construction of major rehabilitation projects. The Dardanelle Powerhouse on the Arkansas River was one of the first major rehabilitation projects approved under the new USACE rehabilitation procedures. The three and one-half year, $23.4 million project will be complete this month. The project involved replacing the turbine runner or bladed part of each unit with a new design that was manufactured and tested by Voith Hydro, Inc. of York, PA. New generator stator coils and electronic governors were installed, and the generators were rewound by Siemens Power, a subcontractor. The changes will help the units operate more efficiently and increase production by 13 percent. The district's next hydropower rehabilitation is waiting in the wings at Ozark Powerhouse. This will be the first rehab project of a slant-axis turbine in the Corps of Engineers. The project was added as a new start in the fiscal 2001 budget following approval of the evaluation report in August 1999. The Hydroelectric Design Center in Portland is working on the plans and specification for the project, and a contract should be awarded by July 2001 for the $50 million project.

Little Rock District, with the help of geographic districts, is designing aircraft control towers for Air Education and Training Bases across the country.

The Air Force's Air Education and Training Command, the customer for Little Rock District's regional control tower program, recently recognized the district and its project manager for outstanding design, contracting and construction work being done to replace aging control towers at AETC bases across the country. The district works hand-in-hand with geographical districts to give the AETC bases seamless service. Six towers are currently in various stages of design and construction under the tower program. The district is constructing the third phase of a C-130 Squadron Operations Facility to continue supporting Little Rock Air Force Base's C-130 mission. This third phase of the project is a design-build 50,000-square foot building worth $8.3 million. Another large military construction project is Pine Bluff Arsenal's Chemical Defense Quality Evaluation Facility. The $18 million project will include the construction of a testing facility for chemical and biological defense equipment to assure it is adequate to protect U.S. forces. Congress authorized the design-build project for fiscal year 2000. Plans and specifications are currently underway.

Little Rock District's trademark is creativity. As evidence to that, we are the only Corps district to receive six Hammer Awards from Vice President Al Gore's National Performance Review. The district



Little Rock District's regional Job Order Contract is great for jobs that don't require a lot of design work. Several districts use the contract to do O&M work as well as numerous customers.

is dedicated to finding the best way to serve our customers. One vehicle used by the district and the Southwestern Division is the Job Order Contract. The first regional JOC was awarded in March 1998. The JOC had the capability to service multiple customers in a six-state area. Tulsa, Little Rock and Vicksburg districts successfully used the JOC to do in-house operations and maintenance work as well as small parts of very large projects. Fort Polk, Fort Chaffee, the Department of Energy and the Bureau of Prisons also have found it useful. The JOC has been so successful that Little Rock District is in the process of re-procuring it. The new JOC has been improved by incorporating input as well as funding from customers. It will now include three contractors instead of two, and one of the contractors will be an 8A contractor. The total contract amount also has been increased from $30 million to $55 million. Little Rock District has been working with Southwestern Power Administration to find a way to make timely major repairs to our hydropower plants that can't wait for major rehabilitation. The teamwork has paid off for everyone. Two units of the Ozark hydropower plant on the Arkansas River had to be taken down for repairs. The district estimated that it would take $1 million to fix each unit, and the repairs wouldn't be done for several years under the major rehab program. SWPA worked with the district to find a way for one of their customers to pay for the repairs. The process was developed, and a Memorandum of Agreement was signed in October by the Assistant Secretary of the Army for Civil Works, SWPA and the city of Jonesboro, Ark., a customer of SWPA. The MOA establishes the working relationship between the parties. Then sub-agreements are written and signed to get specific cost transfers and repairs done quickly. The city of Jonesboro initially pays for the repair, and the Corps does the repair work. SWPA credits Jonesboro's account for the money they paid towards the repairs. After the sub-agreements are signed, it takes about one month to get the money in hand and the work started.

Little Rock District's Engineering and Construction Division is proud of our long history of service to the nation, but we aren't living in the past. Our employees have shown that we aren't afraid to try new things if it will improve service to our customers. If you want more information on district projects, visit our web site at http://www.swl.usace.army.mil.

POC'S: DON DUNN, CESWL-EC, 501-324-5566, AND WAYNE LEWIS, CESWL-EC-C, 501-324-5558

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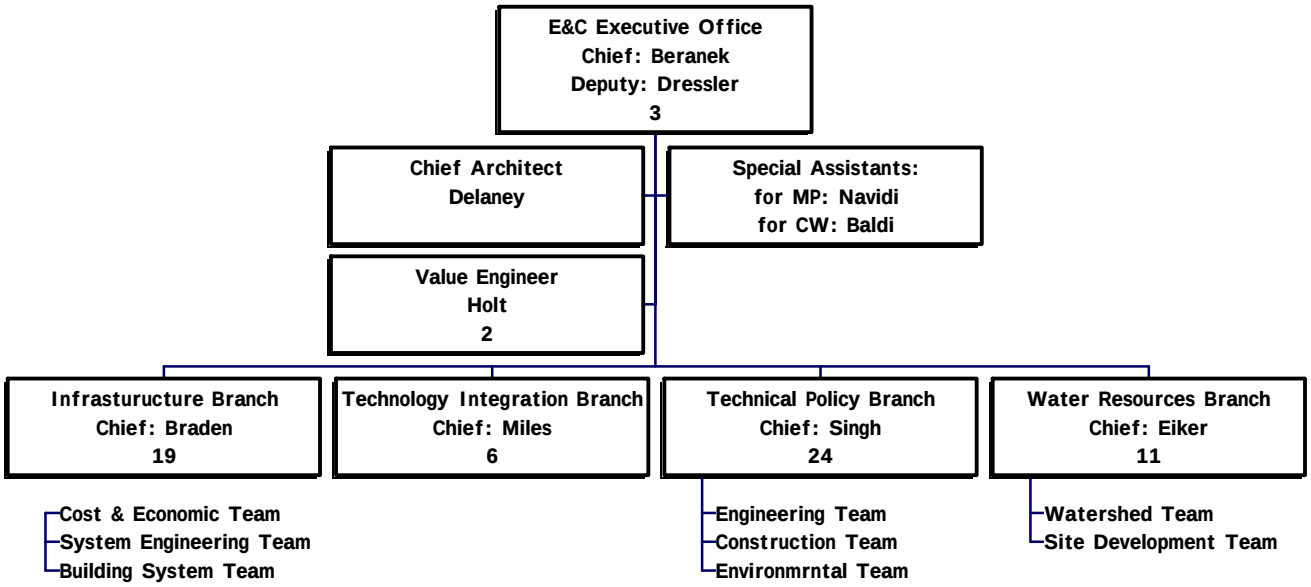
Reorganization News

ENGINEERING AND CONSTRUCTION REORGANIZATION MOVES INTO HIGH GEAR

As we started the month of June, selections were made for the deputy division chief and the four branch chiefs in the restructured Engineering and Construction Division. Mr. Donald R. Dressler was selected to be the deputy division chief effective 16 July 2000. The new branch chiefs are Mr. Earl E. Eiker, Chief, Water Resources Branch; Mr. Roy E. Braden, Chief, Infrastructure Branch; Mr. Moody K. Miles, Chief, Technology Integration Branch; and Hari N. Singh, Chief, Technical Policy Branch. The new supervisors are work with Dwight Beranek to have the whole E&C family together so we are up and running by 16 July, the official implementation date of the HQ Restructuring. An organization chart for the restructured Division is shown below. A more detailed organization chart for the

restructured Division showing the individuals assigned to each team will be sent to the field in early July 2000 with current telephone numbers shown. The chart will be revised to show the (703) 428-XXXX telephone numbers for the Kingman Building once those numbers are assigned.



Several members of the E&C staff have visited the third floor of the Kingman Building and found that the contractor has demolished most of the existing interior walls on that third and is on schedule for starting reconstruction of the area. The transition team is continuing to work with the HQUSACE staff to insure that Engineering and Construction Division remains operational in the Pulaski Building after the GAO move until the move to the Kingman Building takes place. It is our desire that the reorganization occur without any disruption of business between Engineering and Construction and the field.

POC: CHARLES PEARRE, CECW-EP, 202-761-4531

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Update

ENGINEER APPENDIX TO DECISION DOCUMENTS

On 14 March 2000, the Deputy Commander for Civil Works issued a memorandum concerning the submission of Engineer Appendix to Decision Documents. The purpose of the memorandum was to reduce costs by reducing the volume of reports sent to Planning and Policy Division for policy review. This was done because Engineering and Construction Division no longer performs a policy review of Engineer Appendices at the Washington level.

The memorandum goes on to state that the final record copy of the decision document will include the Engineer Appendix and that printed copies to be forward to the Administration and Congress because include the Engineer Appendix.

The memorandum emphasized the importance of the Engineer Appendix in the decision working process. However, there have been a number of questions concerning the wording of paragraph 2 in the memorandum. These questions have risen due to the fact that the policy review of engineering

documents cannot be separated from the technical review of the document. Therefore, the independent technical review team at the District level should complete the policy review of each Engineer Appendix during their review of the appendix. The requirement that an electronic copy of the Engineer Appendix be available at the district was included to help reduce lost review time if a reviewer needed to reference information in the Engineer Appendix.

Basically the memorandum only changed portions of the decision document that would be printed and forwarded for Washington level review. The memorandum did not change the content of the decision documents.

POC: CHARLES PEARRE, CECW-EP, 202-761-4531

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NEW HOSPITAL FOR FORT BRAGG

A colossus rising beyond the shadow of its predecessor, the new Womack Army Medical Center opened its doors to the public March 9. It took approximately 50 different government offices, several prime contractors, 75 subcontractors, $400 million and almost a decade of planning and implementation to deliver one the Army's most technologically advanced health-care facilities.
In September 1990, Savannah District contracted with Smith, Hinchman and Grylls and Associates of Detroit, Mich., to design the multi-year, multi-phased hospital project for Fort Bragg, NC. It was the largest design contract the district had ever awarded, and it would take four years to complete the design.

Because the hospital complex was designated a Department of Defense Medical (DoDM) project, some 50 different government agencies were involved, including the U.S. Army Medical Command, the Health Facilities Planning Agency, Womack Army Medical Center Command, the XVIII Airborne Corps and Fort Bragg, and the U.S. Army Corps of Engineers. "All of these agencies helped to develop the project management plan, which outlined how the agencies would interact with each other and their different responsibilities," said Pete Oddi, the district's project manager for the hospital.
Womack Army Medical Center was built for $250 million with funds from Base Closure and Department of Defense Military Construction appropriations. It was built in three phases. Phase I, site work and basic infrastructure, was awarded to Highway Constructors, Inc., for $8.8 million. Phase II, the structural shell of the central energy plant, went to D.S. Simmons for $2.8 million. Phase III, construction of the medical center and completion of the energy plant and all remaining site work, was awarded to Centex Construction Company for $19.1 million.

Officials "broke ground" for the new hospital complex in September 1992, and by February 1995, Centex had begun construction of the final phase of the medical center. In all, Centex employees and about 50 different subcontractors worked more than four million man-hours to complete the project.
"The modern health-care facility is generally more complex than other facilities because the care of the patient is the prime consideration in every decision," said Allen Rowe, the district's resident engineer for the Womack Army Medical Center Field Office.

Medical facilities are unique also because of the complexity of the systems that need to be in place, and the sheer scope of the work— in the case of Womack, more than 5,000 drawings and 5,000 pages of specifications.

Rowe said the medical mission changed rapidly from the time Womack was designed until the project was completed. "You have to understand that when a new health-care facility opens its doors, the user

expects it to be the latest and best on the market," he said. "If we constructed it just like the drawings, the medical center would already be outdated. That means the design... must be modified. There has to be a procedure for prompt review, approval, funding and accomplishing many change orders to the contract." [The district made more than 500 modifications to the hospital project.]

The resident office and the Health Facilities Project Office (HFPO) worked with the contractor to determine when to make mission-oriented design changes— whether during construction, without delaying work, or after the project is turned over. This coordination during the construction and turnover of the medical center was facilitated by the co-location of HFPO and the field office. Savannah District turned over the medical center to the Womack Transition Office in phases. The very first thing to be turned over was the All American Highway extension created to accommodate the new hospital. In mid-1998 several warehouse areas were turned over so that the incoming equipment and supplies could be received and processed. "B" building, which houses most of the medical center's ancillary clinics and departments, was turned over in sections, beginning with Radiology in November 1998 and ending with Outpatient Surgery and Dental in February 1999. "A" building, or outpatient clinics, was turned over December 1998. Finally, "C" building (the in-patient tower) was turned over the summer of 1999. The last to be turned over was the food service area, January 2000.

The new Womack Army Medical Center started receiving inpatients March 18, and was open for appointments March 20. Approximately 2,000 doctors, nurses, and various other staff will serve more than 160,000 beneficiaries, which includes active and retired soldiers and their respective families living in and around the Fort Bragg area.
(The article above is a condensed version of an article from the Savannah District Castle. The entire article can be found at http://www.sas.usace.army.mil/castle*)*

POC: ALICIA GREGORY, CESAS-PA, 912-652-5761

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Dam Safety

DAM SAFETY COORDINATORS WORKGROUP

On 15 June 2000, the Corps of Engineers Dam Safety Officer established the Army Dam Safety Workgroup. The workgroup will include a representative from each Corps of Engineers Major Subordinate Command and other appropriate representatives form Department of the Army.

The Workgroup will provide a permanent forum for working-level discussion of Dam Safety (DS) issues with applicability to Department of Defense dams (military and civil). The members of the Workgroup will serve as national program representatives on several interagency subcommittees and task forces. The Workgroup will be the identified peer review group for coordination of updates to guidance documents, and for ensuring consistency of portfolio-type risk assessments. Each MSC has been asked to designate a representative by 5 July 2000.

POC: CHARLES PEARRE, CECW-EP, 202-761-4531

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SEMINAR ON EVALUATION OF CONCRETE DAM STABILITY

The Association of State Dam Safety Officials is conducting a seminar on the subject of "Evaluation of Concrete Dam Stability" in Atlantic City, NJ, on 13 and 14 July 2000. The cost of the seminar is $100 for ASDSO members.

These ASDSO seminars are good opportunities for continuing education for engineers and other professionals working with dams and levees. Additional information on the seminar and a registration form can be downloaded from the ASDSO web site at http://www.damsafety.org/reg_tech_sem.html.

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USCOLD ANNUAL MEETING

This year's annual meeting of the U.S. Committee on Large Dams will be held in Seattle, Washington, from 11 – 14 July 2000. The theme of the two-day lecture program is Operation, Maintenance, Repair and Rehabilitation of Dams. The opening session will include an update on the National Dam Safety Program by Don Bathurst of FEMA and Current Activities of The World Bank by Alessandro Palmieri. The technical presentations represent the full range of electrical, mechanical, structural, materials and civil engineering activities associated with O&M. Technical tours (Seattle City Lights and Corps projects) focusing on O&M will follow the lecture. Registration forms will be available in early May – contact Larry Stephens of USCOLD (303) 628-5430.

POC: ART WALZ, CECW-EG, 202-761-8681

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DAM SAFETY 2000

Make plans to attend the 17th Annual Conference of the Association of State Dam Safety Officials. Dam Safety 2000, which features a brand new schedule of events, will be held at the Westin Providence and the adjoining Rhode Island Convention Center, 25-30 September 2000.

A technical seminar on Stability Analysis will be presented on Monday and Tuesday (September 25 and 26). The Corps of Engineers Dam Safety Coordinators Conference will start after the seminar on Tuesday, September 26, and continued on Wednesday, September 27. The ASDSO conference will open on Thursday, September 28 with General and Technical Sessions. The conference will continue through Saturday, September 30.

For more information call Susan Sorrel at ASDSO (859) 357-5146 for details. Or send an email to sasorrell@damsafety.org. Or visit the ASDSO homepage at http://www.damsafety.org. Registration materials will be mailed to all ASDSO members in the near future.

POC: ROBERT BANK, CECW-EP, 202-761-1660

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Information

GENERAL PAINTING GUIDE SPECIFICATION

The Corps of Engineers guide specification for general painting; CEGS 09900 has undergone major changes in recent years due to changes in regulations, technology, and government acquisition. Thus, the Corps is changing its whole approach to painting. We have seen the cancellation of dozens of Federal and Military paint specifications. These were replaced by Commercial Item Descriptions (CIDs), which are performance-based documents that are intended to be met by off-the-shelf commercial paints and coatings.

We have not yet seen the end of the changes. In response to the continuing reform of government acquisition practices, the General Services Administration has begun to cancel the CIDs for paints and coatings. CEGS 09900 is being revised this year to replace the remaining Federal specifications and the CIDs with industry specifications prepared by the Master Painter's Institute (MPI). Each of the MPI specifications has an associated list of approved products.

Traditionally, paints meeting Military and Federal specification were made by a few regional paint companies. The product lines of the major manufacturers were sold to the Government as "performance equals", even though they often did not meet the full set of specification requirements. The use of approved products lists is a new approach to doing business.

New environmental regulations have also influenced the guide specification. In September 1999, a new, national rule was put into effect, limiting the volatile organic compound (VOC) content of paints and coatings. Previously, this type of rule was in effect only in areas with air quality problems. A number of high-VOC paint systems have been dropped from CEGS 09900 and replaced with waterbased or other lower-VOC paint systems.

These changes will have major impact on the Corps construction contracts through the next few years. It is recommended that Corps construction activities identify one or two persons to stay current with these changes. The new version of CEGS 09900 will be available this calendar year, and will be presented at the Corps PROSPECT course #084, Paint, Coatings and Quality Assurance, to be held in Arlington, TX, 12-16 February 2001. Because safety in painting has been a recent issue at some Corps projects, the FY01 course will have an increased emphasis on safety. If you have any questions concerning the course, please contact the Point of Contact shown below.

POC: JANIME WRIGHT, CEHR-P-TO, 256-895-7455

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Training

EMERGENCY ACTION PLAN EXERCISES

The Federal Energy Regulatory commission (FERC) is offering a training course on table top and full scale emergency action plan exercises. FERC is offering this course two more times this year at the following locations:

Denver, Colorado	June 27-28, 2000
Bloomington, Minnesota	July 11-12, 2000

FERC is encouraging dam safety official to attend this course. To get further information on the course, contact Frank Calcagno at 202-219-2736 (frank.calcagno@ferc.fed.us) or Natalie Leech at 202-219-2736 (natalie.leech@ferc.fed.us).

POC: CHARLES PEARRE, CECW-EP, 202-761-4531

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Open Discussion and Comments

No Discussion Items were received for this month's newsletter.

(Editors' note: If you want to share your thoughts with our readers regarding a subject of general interest, send an email to the E&C News editor at charles.pearre@usace.army.mil. A synopsis of your comments will be published next time).

Editors' Notes

SUBSCRIBE TO ECNEWS

Engineering and Construction News uses a subscription list on the Corps List Server. The name of the list is LS-ECNEWS. The purpose of the list is to distribute the Civil Works and Military Programs Engineering and Construction community newsletter, *Engineering and Construction News*.

You can subscribe or unsubscribe to LS-ECNEWS by sending an e-mail message to majordomo@usace.army.mil with no subject line and only a single line of text in the message body. That single line of text should have the following format: **subscribe ls-ecnews** or **unsubscribe ls-ecnews**. The List Server system will automatically pick up your originating e-mail address from the message and add it to or delete it from the distribution list.

If you have any questions about the list server, see the List Server E-Mail Delivery System web page at http://eml01.usace.army.mil/other/listserv.html. Or you may contact either Denise Massihi or Charles Pearre if you have additional questions on the subscription list.

POC: CHARLES PEARRE, CECW-EP, 202-761-4531

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